- $R = \{t \equiv t \mid t \in \mathcal{T}(\Sigma)\}$
- $S(\mathcal{E}) = \{t \equiv s \mid s \equiv t \ \in \mathcal{E}\}$
- $T(\mathcal{E}) = \{s \equiv r \mid$ there exists a $t \in \mathcal{T}(\Sigma)$ with $s \equiv t \ \in \mathcal{E}$ and $t \equiv r \ \in \mathcal{E}\}$
- $C(\mathcal{E}) = \{f(s_1, \ldots, s_n) \equiv f(t_1, \ldots, t_n) \mid f \in \Sigma, s_i \equiv t_i \ \in \mathcal{E}\}$

Congruence Closure

- $\mathcal{E}_0 = \mathcal{E} \cup R$
- $\mathcal{E}_{i+1} = \mathcal{E}_i \cup S(\mathcal{E}_i) \cup T(\mathcal{E}_i) \cup C(\mathcal{E}_i)$
- Congruence closure $CC(\mathcal{E}) = \bigcup_{i \in \mathbb{N}} \mathcal{E}_i$

Thm. 3.2.7 (Congruence Closure Sound and Complete)

$s \equiv_{\mathcal{E}} t$ iff $s \equiv t \ \in CC(\mathcal{E})$